BIOC 310 Syllabus and Course Policy — 2014-15Academic Year

BIOC 310 Instructor: Dr. Dereth Phillips (derethp@rice.edu; Anderson 340) serves as a general resource for all current BIOC 310 students and as the on-campus advisor/instructor of record for all off-campus research. If your research takes place in a Rice University lab, your BioSciences department professor or sponsoring professor will be your instructor for the course.

Office Hours: Dereth Phillips's office hours are Wednesdays at 3 pm or by appointment. Students should contact their individual research professors for office hours or to set up meeting times.

Course objectives and expected learning outcomes

Upon completion of this independent mentored research experience and related course requirements, students should be able to:

- Describe the state of current scientific knowledge and identify the key questions in a focused area of laboratory-based biological or biomedical research
- Perform relevant current research methodologies with an awareness of the advantages and limitations of each in the context of the questions to be solved
- Design experiments with appropriate positive and negative controls
- Identify and troubleshoot problems encountered when performing particular protocols
- Analyze data collected and identify the relevance of findings to the scientific problem at hand
- Effectively communicate research experience through written and oral reports

Requirements for BIOC 310 course credit

BIOC 310 is an independent program of study for students interested in biological or biomedical research. All students will complete a laboratory-based independent research project under the supervision of a faculty member. There is no formal classroom instruction.

Summary: BIOC 310 students must perform research in the laboratory of a faculty member in the Biochemistry and Cell Biology (BCB) Program in the BioSciences Department at Rice University (sections 3 and above) or in off-campus Texas Medical Center laboratories (sections 1-2). Students are required to spend at least 3 hours per week in the laboratory for each semester hour of credit (42 hours/credit/semester). Additional weekly time should be allotted for reading of the scientific literature and writing reports. If taken for 3 or more hours, BIOC 310 counts as one required lab course but not as 300-level elective in Natural Sciences or Engineering. BIOC 310 requires a research proposal, weekly reports and a final project (research paper in the fall semester / paper or poster presentation in the spring semester pending professor permission and RURS acceptance). The prerequisite is either BIOC 111 or BIOC 211 and instructor permission is required. To receive credit, a student must participate in a laboratory-based biosciences research project. Credit cannot be received for physician shadowing. Students will not receive course credit if they are being paid for their work. It is strongly recommended that all students register for 3 credit hours their first semester of BIOC 310. Fewer hours will leave insufficient time for meaningful research and more might be unsustainable with a busy academic schedule. Students in the off-campus sections (sections 1 and 2) must register for at least 3 credits.

Finding a lab: Prior to enrollment in BIOC 310, you must secure a position in a laboratory. You can identify candidate labs by reading faculty members' scientific publications and website research summaries. You can then email the faculty member to inquire about the possibility of performing research in their lab. If the faculty member agrees, you and the faculty member can meet and discuss the available projects, the number of hours to sign up for, and other details. For additional help with locating research opportunities on or off campus, see the BIOC 310 manual (www.bioc.rice.edu/bioc310/) section on "Finding a research lab". You may also contact Dr. Dereth Phillips (derethp@rice.edu).

Registration: Once you have found an on-campus BioSciences BCB program lab, you must obtain a special registration form (http://registrar.rice.edu/student/special_registration/), obtain the signature of your BioSciences research professor, and register for that professor's section of BIOC 310. If you wish to perform BIOC 310 research off-campus, you must complete a BIOC 310 Off-Campus application form ("application" link on www.bioc.rice.edu/bioc310/) at least two weeks before the start of classes. The BIOC 310 instructor

will contact your off-campus professor to confirm that s/he has agreed to host you in their lab. On confirmation, the instructor will then prepare a BIOC 310 registration form for you. Note: For on-campus researchers, the instructor serves as a course resource. For off-campus research students, the BIOC 310 instructor also serves as the on-campus professor and contributes to the assigned grades. All BIOC 310 students should register before the beginning of the semester. Students who begin their research late will be required to make up missed research hours over the course of the semester.

Required writing assignments

Research proposal: Prepare a 1-page research project proposal containing an abstract that summarizes the basis of the planned project, experimental aims for the semester, and references. Develop this proposal in consultation with your professor and submit it to all of your advisors (professor, mentor, and the instructor of your BIOC 310 section) before the end of the second week of classes. To ensure that all students communicate with their research professors and secure viable research projects in a timely manner, there will be a grade penalty for late submission of the research proposal. Late proposals decrease the final semester letter grade for each week late. For example: an "A" student who submits the proposal in the third week of classes would earn an "A-", in the fourth week a "B+", and so on. One purpose of this research proposal is to help you get concrete guidance early. Your deadline to submit this document gives your professor a deadline to provide you with input.

Weekly progress reports: Send weekly email progress reports to your professor and your research mentor; off-campus students will copy their reports to the instructor of their BIOC 310 section as well. This weekly email will include: hours in lab that week, experiments conducted, results obtained, conclusions drawn, and plans for the following week. These reports will be due by the end of each week (Saturday, 11:59 pm). Your professor is welcome to request an earlier deadline. Please consult the weekly report section of the BIOC 310 manual for the suggested format and examples.

Final project: A research paper will be required in the fall semester and a paper or poster will be required in the spring semester. On-campus students will turn in their final project to their BioSciences BCB program professor and their research mentor; off-campus students will hand in their projects to the Rice instructor of their BIOC 310 section as well as their off-campus professor and research mentor. Submit drafts of papers or posters to these same individuals for comments prior to the final deadline. See the "Schedule and Deadlines" below for the relevant deadlines. For off-campus researchers, the professor's signature on the final project or confirming email will be required to indicate that your documents have been reviewed and approved. Alternatively, the professor may send an electronic copy of the final document as proof of receipt. The research paper is due at 5 pm on the last day of finals; the poster, if students are approved to present one, will be presented at the Rice Undergraduate Research Symposium (RURS) in the spring (http://rurs.rice.edu/). First semester BIOC 310 students will prepare research papers. After their first semester of research, BIOC 310 students, approved by their research professors to do so, may present a poster in the spring session. It is the student's responsibility to register for the poster session. Individual professors may impose additional requirements, such as a research paper in the spring semester, and should inform students of these additional requirements and associated due dates by the end of the second week of classes.

Schedule and Deadlines

All written materials (student agreement form, proposal abstract, weekly reports, paper/poster drafts and final paper/poster) must be submitted to your **research professor** and copied to your **mentor at the bench**. If you are in an off-campus section (sections 1 or 2) you will also submit copies to the **BIOC 310 instructor** listed for that section. *These people receiving copies of your work will be called collectively "**your advisors**" for the purpose of the course deadlines.

Fall semester

Spring or summer – prospective BIOC 310 students begin planning for fall semester; find professor, gain acceptance into a lab; off-campus research students contact BIOC 310 instructor, complete Medical Center paperwork and safety training, and *submit BIOC 310 application at least two-weeks prior to the start of classes*; all students must complete and submit Student Agreement Form to your advisors*.

- **By the end of each week (Saturday, 11:59 pm)** – email weekly report to your advisors.
- **Before the end of the second week (Saturday, 11:59 pm)** – email 1-page proposal (abstract, aims, and references) to your advisors.
- **Date TBA** (Time and location TBA) – informational meeting with the BIOC 310 instructor or writing consultant.
- **Last week in October** – email outline to your advisors and request feedback.
- **Last week of classes (or before)** – draft of research paper due to your advisors for feedback.
- **Due by the BIOC 310 final exam time slot (see registrar's exam listing for BIOC 310)** – final research paper and time sheet due to your advisors and uploaded to your BIOC 310 drop box. For off-campus research students, the final research paper, handed in to the BIOC 310 instructor, should include the signature of the professor. (Alternatively the final copy of the research paper can be emailed to the BIOC 310 instructor by the research professor as a confirmation of its receipt).

Spring semester

- **Fall** – begin planning for spring semester (and summer research); find professor, gain acceptance into a lab; off-campus research students contact BIOC 310 instructor, complete Medical Center paperwork and safety training, and *submit BIOC 310 application at least two-weeks prior to the start of classes*; all students must complete and submit Student Agreement Form to your advisors.
- **By the end of each week (Saturday, 11:59 pm)** – email weekly reports to your advisors.
- **Before the end of the second week (Saturday, 11:59 pm)** – email 1-page proposal (abstract, aims, and references) to your advisors
- **Date TBA** (Time and location TBA) – informational meeting with the BIOC 310 instructor or communication consultant.
- **Late February** – if presenting a poster, submit poster abstract with title and author list to your advisors for review.
- **Early-mid March** – if presenting a poster, submit poster abstract and registration to RURS (check RURS website).
- **Mid-late March** – if presenting a poster, submit poster or paper draft to your advisors for feedback!! If writing a paper, present an outline of your paper to your advisors for review.
- **First week of April or earlier** – if presenting a poster, print completed poster and present at RURS poster session.
- **Last week of classes (or before)** – if writing a paper, present draft of research paper due to your advisors for feedback.
- **Due by the BIOC 310 final exam time slot (see registrar's exam listing for BIOC 310)** –*Final poster* (electronically and printed as a single 8.5x11 inch page) and time sheet due to your advisors and uploaded to your BIOC 310 drop box. For off-campus students, the final poster one-page printout handed in to the BIOC 310 instructor should include the signature of the professor. (Alternatively the final copy of the poster can be emailed to the BIOC 310 instructor by the research professor as a confirmation of its receipt). **–or—**
  —*Final research paper* and time sheet due to your advisors and uploaded to your BIOC 310 drop box. For off-campus research students, the final research paper, handed in to the BIOC 310 instructor, should include the signature of the professor. (Alternatively the final copy of the research paper can be emailed to the BIOC 310 instructor by the research professor as a confirmation of its receipt).

Student agreement

Over the course of the semester, we expect that BIOC 310 students will:

1. spend *at least* 3 hours in lab per week per credit hour of BIOC 310 (42 hours/credit/semester)
2. be intellectually engaged in their research

3. be familiar with the relevant research (read articles, confer with researchers)
4. understand the larger context of their work
5. perform experiments carefully and with an attention to detail
6. keep a detailed notebook
7. be responsible with lab reagents and equipment
8. keep a regular lab schedule and inform their professor and bench mentor prior to an absence
9. be on time for meetings and experiments
10. work well with and be respectful of their bench mentor and other lab colleagues
11. complete clear and detailed weekly reports by Saturday night of each week
12. complete a thoughtful proposal abstract by the end of the second week of classes
13. present their research and research findings clearly and effectively in a final research paper or poster presentation
14. properly cite all contributions by others (published and unpublished) in all of their written work for this course, in accordance with course policies regarding plagiarism
15. share drafts with their research professor and mentor, giving them an opportunity to suggest edits and approve documents, prior to submission of any final copy of papers or posters
16. ask for clarification from their professor, mentor, and course instructor if they are unsure of any of their lab protocols or course expectations

In addition to the syllabus and course policy, all students are responsible for familiarity with the content of the BIOC 310 manual (www.bioc.rice.edu/bioc310/).

Honor code for BIOC 310

Guidelines for collaboration with colleagues: As research is a collaborative effort, you are expected to communicate with and receive input from others. While the work reported in your written materials should be your own, you may include data and figures produced by other members of your lab as background if they are relevant to your conclusions about your own research and are properly attributed to the individual(s) who produced them. Although many of the projects in a lab originate from a common starting point, your abstract, summary, and introduction should be in your own words and not simply copied (plagiarized) from existing lab documents.

Guidelines for proper citation of written work: Plagiarism is a form of academic fraud and is a violation of the Rice Honor Code. Forms of plagiarism include: copying a source word-for-word, inadequate paraphrasing without proper acknowledgement, and claiming another's ideas as one's own. BIOC 310 students are required to educate themselves in the use of proper citations in all of their written work by reading the following three sources:

- the Rice Honor Code information on Academic Fraud and Acknowledgement of Sources: http://honor.rice.edu/honor-system-handbook/
- the document, "Recognizing and Avoiding Plagiarism" by Dr. Janice L. Hewitt, which is posted in the resources folder on the BIOC 310 Owl-Space site
- the BIOC 310 manual sections, "When should I reference something?" and "How do I reference material from a review article?" written by Dr. Richard Gomer

Disability support

Guidelines for students with disabilities: If you have a documented disability that will impact your work in this class, please inform your research professor to discuss your needs (off-campus students should inform their section instructor as well). Additionally, you will need to register with the Disability Support Services

Office in the Allen Center. For more information visit the Rice Disability Support Services site (www.dss.rice.edu).